

WHAT IS CLAIMED IS:

1. A method of manufacturing a display device comprising:
forming a thin film transistor over a substrate, the thin film transistor comprising a semiconductor region and a gate electrode with a gate insulating film interposed therebetween;
forming a first layer comprising titanium on the semiconductor region;
forming a second layer comprising aluminum on the first layer;
forming a third layer comprising titanium on the second layer; and
forming a pixel electrode comprising a conductive oxide film on the third layer.
2. A method of manufacturing a display device according to claim 1 wherein the semiconductor region comprises crystalline silicon.
3. A method of manufacturing a display device according to claim 1 wherein the conductive oxide film comprises one selected from the group consisting of indium tin oxide, zinc oxide, and nickel oxide.
4. A method of manufacturing a display device according to claim 1 wherein the first layer comprises titanium nitride.
5. A method of manufacturing a display device according to claim 1 wherein the second layer comprises aluminum containing 1% silicon.
6. A method of manufacturing a display device according to claim 1 wherein the third layer comprises titanium nitride.
7. A method of manufacturing a display device according to claim 1 wherein the gate electrode comprises at least one selected from the group consisting of aluminum, silicon, titanium, tantalum, tungsten, and molybdenum.
8. A method of manufacturing a display device according to claim 1 wherein the gate electrode is formed over the semiconductor region.
9. A method of manufacturing a display device according to claim 1 wherein the display device is an active matrix type liquid crystal display device.
10. A method of manufacturing a display device comprising:

forming a thin film transistor over a substrate, the thin film transistor comprising a semiconductor region and a gate electrode with a gate insulating film interposed therebetween;

forming a first layer comprising titanium on the semiconductor region;

forming a second layer comprising aluminum on the first layer;

forming a third layer comprising titanium on the second layer;

forming a conductive oxide film on the third layer; and

patterning the conductive oxide film so as to form a pixel electrode.

11. A method of manufacturing a display device according to claim 10 wherein the semiconductor region comprises crystalline silicon.

12. A method of manufacturing a display device according to claim 10 wherein the conductive oxide film comprises one selected from the group consisting of indium tin oxide, zinc oxide, and nickel oxide.

13. A method of manufacturing a display device according to claim 10 wherein the first layer comprises titanium nitride.

14. A method of manufacturing a display device according to claim 10 wherein the second layer comprises aluminum containing 1% silicon.

15. A method of manufacturing a display device according to claim 10 wherein the third layer comprises titanium nitride.

16. A method of manufacturing a display device according to claim 10 wherein the gate electrode comprises at least one selected from the group consisting of aluminum, silicon, titanium, tantalum, tungsten, and molybdenum.

17. A method of manufacturing a display device according to claim 10 wherein the gate electrode is formed over the semiconductor region.

18. A method of manufacturing a display device according to claim 10 wherein the display device is an active matrix type liquid crystal display device.

19. A method of manufacturing a display device comprising:

forming a thin film transistor over a substrate, the thin film transistor comprising a semiconductor region and a gate electrode with a gate insulating film interposed

therebetween;

forming a first layer comprising titanium on the semiconductor region;

forming a second layer comprising aluminum on the first layer;

forming a third layer comprising titanium on the second layer;

patterning the first to third layers so as to form an electrode; and

forming a pixel electrode comprising a conductive oxide film on the third layer of the electrode.

20. A method of manufacturing a display device according to claim 19 wherein the semiconductor region comprises crystalline silicon.

21. A method of manufacturing a display device according to claim 19 wherein the conductive oxide film comprises one selected from the group consisting of indium tin oxide, zinc oxide, and nickel oxide.

22. A method of manufacturing a display device according to claim 19 wherein the first layer comprises titanium nitride.

23. A method of manufacturing a display device according to claim 19 wherein the second layer comprises aluminum containing 1% silicon.

24. A method of manufacturing a display device according to claim 19 wherein the third layer comprises titanium nitride.

25. A method of manufacturing a display device according to claim 19 wherein the gate electrode comprises at least one selected from the group consisting of aluminum, silicon, titanium, tantalum, tungsten, and molybdenum.

26. A method of manufacturing a display device according to claim 19 wherein the gate electrode is formed over the semiconductor region.

27. A method of manufacturing a display device according to claim 19 wherein the display device is an active matrix type liquid crystal display device.

28. A method of manufacturing a display device comprising:

forming a thin film transistor over a substrate, the thin film transistor comprising a semiconductor region and a gate electrode with a gate insulating film interposed therebetween;

forming a first layer comprising titanium on the semiconductor region;
forming a second layer comprising aluminum on the first layer;
forming a third layer comprising titanium on the second layer;
patterning the first to third layers so as to form an electrode;
forming a conductive oxide film on the third layer of the electrode; and
patterning the conductive oxide film so as to form a pixel electrode.

29. A method of manufacturing a display device according to claim 28 wherein the semiconductor region comprises crystalline silicon.

30. A method of manufacturing a display device according to claim 28 wherein the conductive oxide film comprises one selected from the group consisting of indium tin oxide, zinc oxide, and nickel oxide.

31. A method of manufacturing a display device according to claim 28 wherein the first layer comprises titanium nitride.

32. A method of manufacturing a display device according to claim 28 wherein the second layer comprises aluminum containing 1% silicon.

33. A method of manufacturing a display device according to claim 28 wherein the third layer comprises titanium nitride.

34. A method of manufacturing a display device according to claim 28 wherein the gate electrode comprises at least one selected from the group consisting of aluminum, silicon, titanium, tantalum, tungsten, and molybdenum.

35. A method of manufacturing a display device according to claim 28 wherein the gate electrode is formed over the semiconductor region.

36. A method of manufacturing a display device according to claim 28 wherein the display device is an active matrix type liquid crystal display device.

37. A method of manufacturing a display device comprising:

forming a thin film transistor over a substrate, the thin film transistor comprising a semiconductor region and a gate electrode with a gate insulating film interposed therebetween;

forming a first layer comprising titanium on the semiconductor region, wherein the

first layer does not contain nitrogen;

forming a second layer comprising aluminum on the first layer;

forming a third layer comprising titanium on the second layer; and

forming a pixel electrode comprising a conductive oxide film on the third layer.

38. A method of manufacturing a display device according to claim 37 wherein the semiconductor region comprises crystalline silicon.

39. A method of manufacturing a display device according to claim 37 wherein the conductive oxide film comprises one selected from the group consisting of indium tin oxide, zinc oxide, and nickel oxide.

40. A method of manufacturing a display device according to claim 37 wherein the second layer comprises aluminum containing 1% silicon.

41. A method of manufacturing a display device according to claim 37 wherein the third layer comprises titanium nitride.

42. A method of manufacturing a display device according to claim 37 wherein the gate electrode comprises at least one selected from the group consisting of aluminum, silicon, titanium, tantalum, tungsten, and molybdenum.

43. A method of manufacturing a display device according to claim 37 wherein the gate electrode is formed over the semiconductor region.

44. A method of manufacturing a display device according to claim 37 wherein the display device is an active matrix type liquid crystal display device.

45. A method of manufacturing a display device comprising:

forming a thin film transistor over a substrate, the thin film transistor comprising a semiconductor region and a gate electrode with a gate insulating film interposed therebetween;

forming a first layer comprising titanium on the semiconductor region, wherein the first layer does not contain nitrogen;

forming a second layer comprising aluminum on the first layer;

forming a third layer comprising titanium on the second layer;

forming a conductive oxide film on the third layer; and

patterning the conductive oxide film so as to form a pixel electrode.

46. A method of manufacturing a display device according to claim 45 wherein the semiconductor region comprises crystalline silicon.

47. A method of manufacturing a display device according to claim 45 wherein the conductive oxide film comprises one selected from the group consisting of indium tin oxide, zinc oxide, and nickel oxide.

48. A method of manufacturing a display device according to claim 45 wherein the second layer comprises aluminum containing 1% silicon.

49. A method of manufacturing a display device according to claim 45 wherein the third layer comprises titanium nitride.

50. A method of manufacturing a display device according to claim 45 wherein the gate electrode comprises at least one selected from the group consisting of aluminum, silicon, titanium, tantalum, tungsten, and molybdenum.

51. A method of manufacturing a display device according to claim 45 wherein the gate electrode is formed over the semiconductor region.

52. A method of manufacturing a display device according to claim 45 wherein the display device is an active matrix type liquid crystal display device.

53. A method of manufacturing a display device comprising:

forming a thin film transistor over a substrate, the thin film transistor comprising a semiconductor region and a gate electrode with a gate insulating film interposed therebetween;

forming a first layer comprising titanium on the semiconductor region, wherein a portion of the first layer in contact with the semiconductor region comprises titanium silicide;

forming a second layer comprising aluminum on the first layer;

forming a third layer comprising titanium on the second layer; and

forming a pixel electrode comprising a conductive oxide film on the third layer.

54. A method of manufacturing a display device according to claim 53 wherein the semiconductor region comprises crystalline silicon.

55. A method of manufacturing a display device according to claim 53 wherein the conductive oxide film comprises one selected from the group consisting of indium tin oxide, zinc oxide, and nickel oxide.

56. A method of manufacturing a display device according to claim 53 wherein the first layer comprises titanium nitride.

57. A method of manufacturing a display device according to claim 53 wherein the second layer comprises aluminum containing 1% silicon.

58. A method of manufacturing a display device according to claim 53 wherein the third layer comprises titanium nitride.

59. A method of manufacturing a display device according to claim 53 wherein the gate electrode comprises at least one selected from the group consisting of aluminum, silicon, titanium, tantalum, tungsten, and molybdenum.

60. A method of manufacturing a display device according to claim 53 wherein the gate electrode is formed over the semiconductor region.

61. A method of manufacturing a display device according to claim 53 wherein the display device is an active matrix type liquid crystal display device.

62. A method of manufacturing a display device comprising:

forming a thin film transistor over a substrate, the thin film transistor comprising a semiconductor region and a gate electrode with a gate insulating film interposed therebetween;

forming a first layer comprising titanium on the semiconductor region, wherein a portion of the first layer in contact with the semiconductor region comprises titanium silicide;

forming a second layer comprising aluminum on the first layer;

forming a third layer comprising titanium on the second layer;

forming a conductive oxide film on the third layer; and

patterning the conductive oxide film so as to form a pixel electrode.

63. A method of manufacturing a display device according to claim 62 wherein the semiconductor region comprises crystalline silicon.

64. A method of manufacturing a display device according to claim 62 wherein the conductive oxide film comprises one selected from the group consisting of indium tin oxide, zinc oxide, and nickel oxide.

65. A method of manufacturing a display device according to claim 62 wherein the first layer comprises titanium nitride.

66. A method of manufacturing a display device according to claim 62 wherein the second layer comprises aluminum containing 1% silicon.

67. A method of manufacturing a display device according to claim 62 wherein the third layer comprises titanium nitride.

68. A method of manufacturing a display device according to claim 62 wherein the gate electrode comprises at least one selected from the group consisting of aluminum, silicon, titanium, tantalum, tungsten, and molybdenum.

69. A method of manufacturing a display device according to claim 62 wherein the gate electrode is formed over the semiconductor region.

70. A method of manufacturing a display device according to claim 62 wherein the display device is an active matrix type liquid crystal display device.